

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions, and listings, of claims in the application:

- 1    1.    (Original) An apparatus comprising:  
2        a switch comprising microelectromechanical elements, the microelectromechanical  
3 elements comprising:  
4            a sealed chamber containing a dielectric element; and  
5            conductors in the sealed chamber,  
6            wherein the conductors are arranged such that application of greater than a  
7 predetermined voltage causes ionization breakdown of the dielectric element to provide an  
8 electrically conductive path between the conductors.
  
- 1    2.    (Currently Amended) The apparatus of claim 1, wherein the dielectric element in the  
2 sealed chamber ~~contains~~ comprises at least one of argon, neon, helium, xenon, nitrogen, oxygen,  
3 and air.
  
- 1    3.    (Currently Amended) The apparatus of claim 2, wherein the dielectric element in the  
2 sealed chamber ~~contains~~ comprises a mixture of at least any two of argon, neon, helium, xenon,  
3 nitrogen, oxygen, and air.
  
- 1    4.    (Original) The apparatus of claim 1, further comprising a substrate and a cover, wherein  
2 the conductors are arranged on the substrate,  
3        wherein the cover, substrate, and conductors define the sealed chamber.
  
- 1    5.    (Original) The apparatus of claim 4, wherein the microelectromechanical elements  
2 further comprise sealing elements provided between a surface of the cover and surfaces of the  
3 conductors to provide the sealed chamber.
  
- 1    6.    (Original) The apparatus of claim 4, wherein the dielectric element comprises at least  
2 one of a dielectric gas and a dielectric liquid.

1 7. (Original) The apparatus of claim 6, wherein the microelectromechanical elements  
2 further comprise a dielectric layer formed over the conductors in the sealed chamber, the  
3 dielectric layer having plural openings adjacent respective conductors to provide discharge paths  
4 from the conductors through the at least one of the dielectric gas and dielectric liquid contained  
5 in the sealed chamber.

1 8. (Original) The apparatus of claim 1, wherein the microelectromechanical elements  
2 further comprise nanotube electron emitters placed on the conductors in the sealed chamber  
3 ~~chambers~~.

1 9. (Currently Amended) The apparatus of claim [[1]] 8, wherein the  
2 ~~microelectromechanical elements further comprise nanotube electron emitters placed on the~~  
3 ~~conductors in the sealed chambers~~ comprise carbon nanotube electron emitters.

1 10. (Original) The apparatus of claim 8, wherein the nanotube electron emitters comprise  
2 boron nanotube electron emitters.

1 11. (Original) The apparatus of claim 1, wherein the conductors each has a curved side, the  
2 curved sides of the conductors facing each other across a portion of the sealed chamber.

1 12. (Original) The apparatus of claim 1, wherein the microelectromechanical elements  
2 further comprise a trigger electrode to receive a pulsed signal to cause breakdown of the  
3 dielectric element in the sealed chamber.

1 13. (Original) The apparatus of claim 12, wherein the trigger electrode is within the sealed  
2 chamber.

1 14. (Original) The apparatus of claim 12, wherein the trigger electrode is outside the sealed  
2 chamber but in the proximity of the sealed chamber.

- 1 15. (Currently Amended) The apparatus of claim 1, further comprising:  
2 an initiator electrically connected to the switch.
- 1 16. (Original) The apparatus of claim 15, further comprising a local energy source to provide  
2 the predetermined voltage to the switch.
- 1 17. (Original) The apparatus of claim 15, wherein the initiator comprises at least one of an  
2 exploding foil initiator, an exploding bridgewire initiator, and a semiconductor bridge initiator.
- 1 18. (Original) The apparatus of claim 1, further comprising a substrate, the conductors  
2 formed on a surface of the substrate, wherein at least a portion of the sealed chamber is between  
3 sides of the conductors.
- 1 19. (Original) The apparatus of claim 1, wherein the dielectric element comprises at least  
2 one of a dielectric gas and dielectric liquid.
- 1 20. (Original) The apparatus of claim 19, further comprising a housing in which the switch is  
2 located, the housing providing the sealing for the sealed chamber.
- 1 21. (Original) The apparatus of claim 1, further comprising a radioactive material in the  
2 proximity of the switch to enhance predictability in the ionization breakdown of the dielectric  
3 element.
- 1 22. (Original) The apparatus of claim 21, wherein the radioactive material is provided in the  
2 sealed chamber.
- 1 23. (Original) The apparatus of claim 21, wherein the radioactive material comprises at least  
2 one of Chromium, Thorium, Potassium, Uranium, Nickel, and a mineral containing a proportion  
3 of Chromium, Thorium, Potassium, Uranium, and Nickel.

1 24. (Original) The apparatus of claim 21, wherein the radioactive material comprises at least  
2 one of Thorite, Uranite, and a rock salt.

1 25. (Currently Amended) A switch comprising:  
2 electrical conductors; and  
3 a dielectric material between the conductors,  
4 wherein each of the conductors has a curved side, the curved sides of the conductors  
5 facing each other across the dielectric material, wherein the electrical conductors and dielectric  
6 material are microelectromechanical elements.

1 26. (Cancelled)

1 27. (Currently Amended) The switch of claim ~~[[26]]~~ 25, further comprising a sealed  
2 chamber containing the dielectric material, the dielectric material comprising a gas.

1 28. (Original) A switch comprising:  
2 conductors;  
3 a dielectric material between the conductors; and  
4 nanotube electron emitters electrically connected to at least one of the conductors,  
5 wherein the dielectric material is adapted to break down in response to applied electrical  
6 energy provided to at least one of the conductors to provide an electrically conductive path  
7 between the conductors.

1 29. (Original) The switch of claim 28, wherein the dielectric material comprises a gas.

1 30. (Original) The switch of claim 29, further comprising a sealed chamber containing the  
2 gas.

1 31. (Original) The switch of claim 30, further comprising a dielectric layer disposed over the  
2 conductors in the sealed chamber, the dielectric layer having openings to expose respective  
3 conductors.

1 32. (Original) The switch of claim 31, wherein the nanotube electron emitters are disposed  
2 in at least one of the openings of the dielectric layer and in electrical contact with at least one of  
3 the conductors.

1 33. (Original) A method of activating a component, comprising:  
2 providing a switch having microelectromechanical elements, the microelectromechanical  
3 elements comprising a sealed chamber containing at least one of a dielectric gas and dielectric  
4 liquid, and conductors in the sealed chamber;  
5 applying an input voltage to at least one of the conductors to cause breakdown of the at  
6 least one of the dielectric gas and dielectric liquid such that an electrically conductive path  
7 extends between the conductors; and  
8 electrically connecting the input voltage to the component through the switch.

1 34. (Original) The method of claim 33, wherein electrically connecting the input voltage to  
2 the component comprises electrically connecting the input voltage to a well device.

1 35. (Original) The method of claim 33, wherein electrically connecting the input voltage to  
2 the component comprises electrically connecting the input voltage to an explosive device.

1 36. (Original) The method of claim 33, wherein electrically connecting the input voltage to  
2 the component comprises electrically connecting the input voltage to at least one of an explosive  
3 foil initiator, an exploding bridgewire initiator, and a semiconductor bridge initiator.

1 37. (Currently Amended) A switch comprising:  
2 at least two conductors; [[and]]  
3 a nanotube electron emitter to form at least part of an electrically conductive path  
4 between the at least two conductors; and  
5 a dielectric element adapted to ionize in response to input energy to provide another part  
6 of the electrically conductive path.

1 38. (Cancelled)

1 39. (Currently Amended) The switch of claim [[38]] 37, further comprising at least another  
2 nanotube electron emitter.

1 40. (Currently Amended) A method comprising:  
2 activating a switch having conductors and at least one of a nanotube electron emitter and  
3 a radioactive isotope electron emitter; [[and]]  
4 conducting electrical current between the conductors through an electrically conducting  
5 path including the at least one of the nanotube electron emitter and radioactive isotope electron  
6 emitter; and  
7 coupling the explosive device to the switch.

1 41. (Cancelled)

1 42. (Original) The method claim 40, further comprising running a tool including the switch  
2 into a well,  
3 wherein activating the switch comprises activating the switch while the tool is in the well.